

Payload Integration Management Schedule

Fluids and Combustion Facility Fluids Integrated Rack

Preliminary
October 4, 2000

AUTHORIZED by CM when under FORMAL Configuration Control	
Date	Signature
10/06/00	/s/ Robert H. Van Niel



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PREFACE

The National Aeronautics and Space Administration (NASA) is developing a modular, multi-user experimentation facility for conducting fluid physics and combustion science experiments in the microgravity environment of the International Space Station (ISS). This facility, called the Fluids and Combustion Facility (FCF), consists of three test platforms: the Fluids Integrated Rack (FIR), the Combustion Integrated Rack (CIR), and the Shared Accommodations Rack (SAR). This document is a payload integration schedule for the FIR with the ISS.

PAYLOAD INTEGRATION MANAGEMENT SCHEDULE
FOR THE
FLUIDS AND COMBUSTION FACILITY
FLUIDS INTEGRATED RACK

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REVISION PAGE
{PAYLOAD INTEGRATION SCHEDULE-FIR}

Revision	Date	Description of Change or ECO's/ECP's Incorporated	Verification and Date
Preliminary	10/04/00	Initial	10/04/00

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1.0 INTRODUCTION

1.1 Purpose.

The purpose of this document is to define the schedule for the integration of FIR into the International Space Station (ISS). These schedules track products (such as data deliveries and analyses) and major milestones (such as Program-level reviews) and are used to ensure that the payload integration process is completed successfully and in a timely manner. The document also serves as a reference so that process improvement teams can have a better understanding of key integration activities, along with their related predecessor and successor activities, in proposing better ways to do business in the future.

1.2 Scope.

The scope of this document defines the schedule for the integration of FIR to the Multi-Purpose Logistics Module (MPLM) and the US Laboratory Module on the International Space Station through launch, as managed by the Payload Integration Manager (PIM) for the Fluids and Combustion Facility (FCF).

2.0 DOCUMENTS

This section lists specifications, models, standards, guidelines, handbooks, and other special publications. These documents have been grouped into two categories: applicable documents and reference documents.

2.1 Order of precedence for documents.

In the event of a conflict between this document and other documents referenced herein, the requirements of this document shall apply. In the event of a conflict between this document and the contract, the contractual requirements shall take precedence over this document. All documents used, applicable or referenced, are to be the issues defined in the CM contract baseline. All document changes, issued after baseline establishment, shall be reviewed for impact on scope of work. If a change to an applicable document is determined to be effective, and contractually approved for implementation, the revision status will be updated in the CM contract baseline. The contract revision status of all applicable documents is available by accessing the CM database. Nothing in this document supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.2 Applicable documents.

There are no applicable documents referenced in this document.

2.3 Reference documents.

The documents in this paragraph are provided only as reference material for background information and are not imposed as requirements.

SSP 57057	ISS Payload Integration Template
SSP 50489	ISS Mission Integration Template
SSP 52000-PIDS	Payload Data Sets Blank Book
SSP 52000-PIA-PRP	PIA Addenda Blank Book
JSC 25187	Flight Production Generic Template

3.0 PAYLOAD INTEGRATION MANAGEMENT SCHEDULE - FIR

The FIR Payload Integration Schedule is shown on the next 8 pages. Need dates for schedule activities are initially calculated based on the Payload Integration template. The template identifies the activities that will be included on the schedule and when they must occur based on their relation to each other and to the projected launch date, increment, or planning period.

Payload integration schedules are baselined by the Payload Mission Integration Team (PMIT). Changes to the schedules are negotiated on an as-required basis by the parties involved, with issues brought back to the PMIT for resolution. Changes to the template itself must be approved by the Payload Control Board (PCB).

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FIR PIM Schedule

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			J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D								
1	Legend																																													
2																																														
3	ISS Planning	Planning Period																																												
4		Increment																																												
5		Launch																																												
6		Flight Hardware Available (FHA)																																												
7		PI Science Selection (TBD)																																												
8	Shuttle Reviews																																													
9																																														
10																																														
11	Station Reviews																																													
12		CoFR #1																																												
13																																														
14		CoFR #2																																												
15																																														
16																																														
17																																														
18	Safety Reviews	Flight Safety Reviews																																												
19		Basic Facility(FIR)																																												
20																																														
21		Subrack P/L LMM																																												
22																																														
23		Integrated Rack																																												
24																																														
25		Integrated Carrier																																												
26																																														
27		On Orbit Integrated Safety																																												
28																																														

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			2000		2001		2002		2003		2004																	
			J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D		
29		Ground Safety Reviews																										
30		Basic Facility(FIR)																										
31																												
32		Subrack P/L LMM							0/I Data Pkg.	07/15						II Data Pkg.	06/15											
33									0/1	09/15	▲					II Data Pkg.	06/15											
34		All P/L's, Compliment of Integ Racks & Carrier															08/15	II ▲										
35	Project Milestones	Hardware Reviews							FIR PDR	12/15	▼	FCF PDR				FIR CDR	03/15											
36		Rack Development														TBD	10/15											
37		Mockup								01/15	▼																	
38		Crew Review																										
39		Engr Model																										
40		Flight Unit																										
41		PTC Trainer																										
42		Ground Integration Unit																										
43		Facility to ISS Verification Testing																										
44		ISSP H/W Delivery																										
45		Development H/W																										
46		ISPR (Flight Rack)																										
47		ARIS																										
48		FCF SPOE Kit (Ref. CIR Schedule)																										
49		Training Rack(FIR)																										
50		PSE																										
51		Integration H/W																										
52		STEP (Del 6/98)																										
53		PRCU								02/15	▼	Accept																
54		Rack Handling Adapter(FCF Procured 6/99)																										
55		Rack Shipping Container(FCF Procured 6/99)																										
56	ISS/STS Mission Integration	PIA Main Volume							02/15	▲	B/L S																	

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57																																														
58		PIA Increment Addenda																																												
59		MIP																																												
60		IDRD																																												
61																																														
62																																														
63																																														
64																																														
65		IDRD Annex 1																																												
66		P/L Config D.S.																																												
67		Manifest & Stowage Data																																												
68		Stowage Item Drawings to CI																																												
69		P/L System Schematics (EL, TH, VES, Vac, Resource, Re)																																												
70		Integrated US Lab System Schematics																																												
71																																														
72		P/L O/O Ops Config Drawings																																												
73		ECL (For KSC)																																												
74		Assembly & Installation Drawings (For KSC)																																												
75		P/L Transfer Config Drawings																																												
76		MIP Annex 1																																												
77																																														
78																																														
79																																														
80	Engineering ICD	ICD																																												
81		FIR HW ICD																																												
82		FIR SW ICD																																												
83																																														
84																																														

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			J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D
85		PL MDM Config Load Release				P (L-14) O	U/D (L-6)
86		MBF--Std. Out			80% (L-24) ▲	100% (L-18) ▲	Eng. (L-12) ▲
87		Shuttle ICD (Cargo Bay) -- N/A			06/24	12/24	06/24
88		Shuttle ICA (Middeck) -- N/A					12/10 ▲ Flt. (L-6.5)
89	Plans/Analysis/Data	FIR Verification Plan			B/L S V	10/24 B/L(L-20)	
90		P/L Verif Report				P (L-15) O	01/26
91		Structural	Fract Ctrl Plan(P) ▲	Fract Ctrl Plan(F) ▲	A (L-22) ▲	11/22 ▲ B (L-19)	
92		P/L Verification Submits		Fract Ctrl Report(P) O	08/22	C (L-12) ▲	D (L-6) ▲ E (L-5)
93		Electrical				06/24	12/21/26
94		EMI/EMC Control,Test Plan	EMI Interface/Compatibility Plan(P) ▲	EMI Interface/Compatibility Plan(F) ▲	08/22 ▲ Plans and Design & Dev Data(L-22)		
95		P/L Verification Submits			A(L-22) ▲ 10/24 ▲ B (L-20)	06/24 ▲ C (L-12)	12/24 ▲ D (L-6)
96		Mechanical	Mass Prop Control Plan (P) V		A (L-20) ▲ 10/24 ▲ B (L-18)	06/24 ▲ C (L-12)	11/12/24 ▲ D (L-6)
97		P/L Verification Submits			A (L-20) ▲ 10/24 ▲ B (L-18)	06/24 ▲ C (L-12)	12/24 ▲ D (L-6)
98		Fluid dynamics					
99		P/L Verification Submits					
100		Environmental					
101		Microgravity (EN-005)	Cntrl Plan Receipt(P) ▲	Cntrl Plan Receipt(F)(L-22) ▲			
102		Acoustics Emissions (EN-006)	Acoustics Cntrl Plan(P) ▲	Acoustics Cntrl Plan(F)(L-26) ▲			
103		P/L Verification Submits	(P) ▲	(F) ▲			
104		FMEA	(P) ▲	(F) ▲			
105		Integrated Logistics Support Plan	(P) ▲	(F) ▲			
106		Limited Life List	(P) ▲	(F) ▲			
107		Reliability,Maint, & Qual Assurance Plan	(P) ▲	(F) ▲			
108		MPLM	(P) ▲	(F) ▲			
109		P/L Verification Submits			A (L-20) ▲ 10/24	B (L-12) ▲ 06/25	C (L-6) ▲ 12/24
110							
111	Operations Integration	Ground Data Services D.S.			S(I-22) 07/19	11/21 O B/L(I-18)	
112		Voice/RT Delivery(NISN)					

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113		POIC Services																																												
114		Non RT/USOC																																												
115		P/L Ping D.S.																																												
116		MIP Annex 2 pt 1 P/L Inputs																																												
117		Groundrules & Constraints																																												
118		P/L On-Orbit Operations Summary(OOS)																																												
119		P/L Ops D.S.																																												
120		POC/OPS Team																																												
121		OPS Prep/Proc POC																																												
122		Plng POC																																												
123		RT/Ops Facilities/User Ops POC																																												
124		RT Direction Authority																																												
125		P/L Ops Team Identification																																												
126		Photo/TV																																												
127		Non-Default Scenes																																												
128		Default Scenes																																												
129		Post Ops Photo/Video Delivery																																												
130		Programmatic Assumptions																																												
131		Ops Baseline																																												
132		Ops Flows																																												
133		P/L Operations Data File (PODF)																																												
134		PL Displays																																												
135		Grnd Cmd Procedures																																												
136		POIC P/L Grnd Cmd Proc																																												
137		Pre Fit Imagery Matrix																																												
138		Rules																																												
139																																														
140																																														

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141		Launch Commit																																				
142		Integ P/L ISS FR Vol B																																				
143		Integ P/L Joint FR Vol C																																				
144		P/L Regulations																																				
145		TSC to POIC Ops Procedures																																				
146		PI to POIC Ops Procedures																																				
147		Grnd Systems ETE I/F Test																																				
148																																						
149																																						
150	Training	Simulator Definition Doc.																																				
151		PTS IDD																																				
152		P/L Training D.S.																																				
153		Multilateral Incr. Trng Plan(MITP)																																				
154		P/L Trng Readiness Review																																				
155		Training Ready (Crew)																																				
156		Simulations																																				
157																																						
158		User Training																																				
159		PSRD Vol II																																				
160		Training Records																																				
161																																						
162																																						
163																																						
164																																						
165																																						
166																																						
167																																						
168	Launch Site Processing	P/L KSC Support reqmts D.S.																																				

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169		MIP Annex 8 (LSSP)																																				
170		KSC Tech Reqmts D.S.																																				
171		OMRS File 8 Vol 2 (ISS to P/L)																																				
172		OMRS File 2 Vol 2 (Orbiter to P/L)																																				
173		TGHR Table																																				
174		P/L O/D at KSC																																				
175		ISPR - FIR																																				
176		ISPR Subrack - LMM																																				
177		MPLM Stowage																																				
178		KSC Stowage Bench Review																																				
179		Middeck Experiments																																				
180		P/L T/O to KSC Utilization																																				
181		FIR																																				
182		FIR T/O for MPLM Install																																				
183		MPLM Stowage																																				
184		Middeck Experiments Standard																																				
185		Middeck Exp(Late Install)																																				
186		P/L Offline Processing																																				
187		Online Processing																																				
188		P/L Closeout																																				
189		P/L Installation																																				
190		Subrack Integration - LMMIA Data Sets																																				
191		IA Main Volume																																				
192																																						
193																																						
194																																						
195																																						
196																																						

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		2000												2001												2002												2003												2004											
		J	F	I	M	A	M	J	J	A	S	O	N	D	J	F	I	M	A	M	J	J	A	S	O	N	D	J	F	I	M	A	M	J	J	A	S	O	N	D	J	F	I	M	A	M	J	J	A	S	O	N	D								
197		IA Increment Addenda																																																											
198		Subrack HW ICD																																																											
199		Subrack SW ICD																																																											
200		Subrack PVP																																																											
201	Facility	TSC Ready (POIC I/F TST & Int Sims)																																																											
202		P/L Software Drops																																																											
203		PCS																																																											

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APPENDIX A ACRONYMS AND ABBREVIATIONS

A.1 Scope.

This appendix lists the acronyms and abbreviations used in this document.

A.2 List of acronyms and abbreviations.

AIRD	Assembly Implementation Requirements Document
ARIS	Active Rack Isolating System
ATDR	Acoustics Test Data Report
B	Basic
B/L	Baseline
BDC	Baseline Data Collection
BS	Baseline Submit
C&DH	Command and Data Handling
CDR	Critical Design Review
CE	Cargo Element
CI	Cargo Item
CIDS	Cargo Item Data/Models Submittal
CIR	Cargo Integration Review
CIST	Crew Increment-Specific Training Start
CM	Configuration Management
COC	Certificate of Compliance
COFR	Certification of Flight Readiness
COUP	Consolidated Operations & Utilization Plan
DAC	Design Loads Cycle
DCTP	Detailed Crew Training Plan
DIL	Deliverables Items List
DLA	Design Loads Analysis
DLR	Design Loads Report
EFA	Engineering Feasibility Assessment
EIA	Express Integration Agreement
EL	Electrical
EMC	Electro-Magnetic Compatibility
EMI	Electromagnetic Interference
ETE	End-to-End
EVA	Extravehicular Activity
EXPRESS	EXpedite the PRocessing of Experiments to Space Station

F	Final
FCU	Functional Check-Out Unit
FDRD	Flight Definition and Requirements Directive
FMEA	Failure Mode and Effects Analysis
FOR	Flight Operations Review
FORR	Flight Operations Readiness Review
FPM	Flight Payload Manager
FPSR	Flight Planning and Stowage Review
FR	Flight Rule
FRR	Flight Readiness Review
FS	Final Submit
FSR	Flight Safety Review
GAS	Getaway Special
GDS	Ground Data Services Data Set
GFE	Government Furnished Equipment
GL&C	Guidelines and Constraints
GOR	Ground Operations Review
GRC	Glenn Research Center
GR&C	Ground Rules and Constraints
GSE	Ground Support Equipment
GSP	Ground Support Personnel
GSR	Ground Safety Reviews
I	Increment (Start)
ICC	Integrated Cargo Carrier
ICD	Interface Control Document
IDRD	Increment Definition and Requirements Document
IDRP	Increment Definition Requirements Plan
IE	Increment End
IEHA	Integrated Element Hazard Assessment
IOP	Increment Operations Plan
IOR	Increment Operations Review
IP	International Partner
IPM	Increment Payload Manager
IP&CL	Instrumentation Program & Command List
IPMM	Integrated Payloads Missions Model
ISPR	International Standard Payload Rack
ISS	International Space Station
ISSP	International Space Station Program
ITRR	Increment Training Readiness Review
IVT	Interface Verification Test
JEM-EF	Japanese Experiment Module - Exposed Facility
JMST	Joint Multi-Segment Station Training
JSC	Johnson Space Center

KSC	Kennedy Space Center
L	Launch
L&R	Launch and Return
LCC	Launch Commit Criteria
LON	Launch On Need
LPIS	Launch Package Integration Stand
LPRR	Launch Package Readiness Review
LSSP	Launch Site Support Plan
MBR	Middeck Bench Review
MCB	Multi-Lateral Coordination Board
MCC	Mission Control Center
MDK	Middeck
MDM	Multiplexer/Demultiplexer
MER	Mission Evaluation Request
MIM	Multi-Increment Manifest
MIP	Mission Integration Plan
MITP	Multi-Lateral Integrated Training Plan
MOD	Mission Operations Directorate
MPLM	Multi-Purpose Logistics Module
MSD	Mass Stowage Device
MSFC	Marshall Space Flight Center
MSS	Mobile Servicing System
MT	Space Shuttle Customer and Flight Integration Office
MV	Main Volume
NASA	National Aeronautics and Space Administration
NCS	Node Control Software
NISN	NASA Integrated Service Network
NPRD	Network Program Requirements Document
O/D	On-Dock
OFA	Operations Feasibility Assessment
OIU	Orbiter Interface Unit
OM	Operations Management
OMRS	Operations and Maintenance Requirements and Specifications
OOS	On-Orbit Operations Summary
OPNOM	Operations Nomenclature
OPS	Operations
OSCAR	On-Orbit Stowage Capabilities and Requirements
OS	Operations Summary
P	Preliminary
P/L	Payload
PALS	Program Automated Library System
PCB	Payload Control Board

PCS	Portable Computer System
PD	Payload Developer
	Product Delivery
PDR	Preliminary Design Review
PDRP	Payload Display Review Panel
PDS	Payload Data Set
PEP	Payload Executive Planner
PI	Principle Investigator
	Payload Integration
PIA	Payloads Integration Agreement
PIM	Payload Integration Manager
PIR	Post Increment Review
PIRR	Payload Increment Readiness Review
PL FR	Payload Flight Rules
PMIT	Payload Management Integration Team
PMM	Payload Mission Model
POC	Point of Contact
PODF	Payload Ops Data File
POIC	Payload Operations Integration Center
POOS	Payload On-Orbit Summary
PP	Planning Period
PPD	Payload Procedures and Displays
PRCU	Payload Rack Checkout Unit
PRMD	Payload Report/Model Delivery
PRR	Payload Readiness Review
PS	Preliminary Submit
PSRD	Payload Simulator Requirements Document
PTC	Payload Training Center
PTCS	Payload Test and Check-out System
PVLR	Pre Verification Loads Review
PVP	Payload Verification Plan
RCN	Requirements Change Notice
RF	Radio Frequency
RT	Real-Time
S	Submit
S/W	Software
SAR	Stage Assessment Review
SCIR	Station Cargo Integration Review
SIR	Stage Integration Review
SO	Standard Out
SODF	System Ops Data File
SOFA	Systems Operations Feasibility Assessment
SOP	Standard Operating Procedure
SORR	Stage Operations Readiness Review

SPOE	Standard Payload Outfitting Equipment
SPPIT	SSTF/PTC/POIC Integrated Training
SPPMIT	SSTF/PTC/POIC/MCC Integrated Training
SPST	SSTF/PTC Standalone Training
SRDS	Support Requirements Data Set
SRR	Station Readiness Review
SSCCD	Space Station Configuration Control Drawings
SSCD/L	Space Station Configuration Drawings/Launch
SSCD/R	Space Station Configuration Drawings/Return
SSP	Space Shuttle Program
SSTF	Space Station Training Facility
STEP	Suitcase Test Environment for Payloads
STS	Space Transportation System
T/O	Turn-Over
TBD	To Be Determined
TGHR	Time-Critical Ground Handling Requirements
TRR	Training Readiness Review
TRDS	Technical Requirements Data Set
TSC	Telescience Support Center
TST	Training Support Team
TVSM	Test Verified CE Structural Model Delivery
U/D	Update
UOP	Utility Outlet Panel
USOC	User Support and Operations Center
VAC	Verification Analysis Cycle
VAR	Verification Analysis Review
VAS	Vacuum
VES	Vacuum Exhaust System
VIPER	Vehicle Integrated Performance and Resources
VLA	Verification Loads Analysis
VMDB	Vehicle Master Data Base

APPENDIX B DEFINITIONS

B.1 Scope.

This appendix defines special terminology used in this document.

B.2 List of definitions.

Complete description of terms used in this document is contained in SSP 57057 Table 3.2-1.